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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,074	04/14/2006	Mane-Si Laure Lee	4590-515	6667
33308 7590 03/23/2009 LOWE HAUPTMAN & BERNER, LLP 1700 DIAGONAL ROAD, SUITE 300 ALEXANDRIA, VA 22314				
EXAMINER				
CHANG, AUDREY Y				
ART UNIT		PAPER NUMBER		
2872				
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03/23/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/576,074

**Applicant(s)**

LEE ET AL.

**Examiner**

Audrey Y. Chang

**Art Unit**

2872

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12 and 17-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's amendment filed on January 6, 2009, which has been entered into the file.
- By this amendment, the applicant has amended claims 12 and 20 and has canceled claim 14.
- Claims 12, and 17-22 remain pending in this application. *Response to Amendment*

### *Response to Amendment*

1. The amendment filed on **January 6, 2009** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **claim 12 has been amended** to include the phrase "first portion ... first pillar type geometry ... the effective index decreases with an increasing fill factor ... a second portion ... a second hole type geometry ... the effective refractive increases in the same direction of increasing fill factor". The specification fails to teach that for the pillar type geometry the effective index decreases with the increase of the fill factor and for the hole type geometry the effective index increases with the increase of the fill factor. Rather as shown in Figures 6a, 6b, 7a, 7b 8 and 9a, the effective refractive index **increases** with the increases of the fill factor for **pillar type geometry**, and the effective index **decreases** with the increase of the fill factor for the **hole type geometry**.

Applicant is required to cancel the new matter in the reply to this Office Action.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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3. **Claims 12 and 17-22 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on the newly added matters are set forth in the section “response to amendment” above.

4. **Claims 12 and 17-22 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

**Claim 12 has been amended** to include the phrase “first portion ... first pillar type geometry ... the effective index decreases with an increasing fill factor ... a second portion ... a second hole type geometry ... the effective refractive increases in the same direction of increasing fill factor”. The specification however fails to teach such are possible. It is implicitly true that for **pillar** type geometry, the effective index can only increase as the fill factor increase, since more refractive material are present than the air region for the pillar type geometry as the fill factor increases. As for hole type geometry, the effective index can only decrease as the fill factor increases since more hole or less the refractive material that air region present as the fill factor increases.

***Specification***

5. The disclosure is objected to because of the following informalities: the equation for the parameter  $\alpha$  as stated in paragraph [0042] contains typographic error. ***The applicant is respectfully noted the symbol " $\lambda_{28}$ " believes to be a typographic error.***

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 12, and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Diffraction phase elements based on two-dimensional artificial dielectric" by Chen et al (Optics Letters, Vol. 20, No. 2, pages 121-123).**

Chen et al teaches a blaze diffractive element serves as a zones for a Fresnel lens wherein at least one of the optical zones comprises a first portion contains pillars of varying size (i.e. with variable fill factor) wherein the pillars has an effective index that decreases with the decrease of the fill factor, (please see Figure 1) and a second portion of holes of varying size (i.e. with variable fill factor) wherein the effective index of the hole portions increases with the decreases of the fill factor, (please see Figure 2). The pillars and holes serve as the microstructures. Chen et al teaches that the diffractive element has effective index ranging from 1.07 to 1.46 (i.e. ranging from minimum to maximum). Since the pillars and holes are etched in the quartz layer, this means the sizes of pillars and holes or the fill factor are varying along the surface of the quartz, (please see page 122, second and third paragraphs).

Chen et al teaches that the maximum and minimum refractive index of the composite material for the pillar portion and hole portion are determined by the curves of variation in the effective index with respect to the fill factor, as shown in Figures 1 and 2.

This reference has met all the limitations of the claims, with the exception that it does not teach explicitly about the parameter " $\alpha$ " as recited in the claim. However it is implicitly true that the optical material, such as quartz or fused silica" has implicit dispersion property, namely the refractive index is a non-constant function of the wavelength. The  $\alpha$  parameter recited in claim 12 is nothing but the dispersion property of the artificial material based on quartz. From Figures 1 and 2, one can easily obtain the maximum and minimum effective indices with respect to the fill factors. And with the inherent dispersion property for the composite material one can deduce the parameter as claimed. One skilled in the art also can design the blaze diffractive element to have desired diffraction order.

**Claim 12 has been amended** to include the phrase "first portion ... first pillar type geometry ... the effective index decreases with an increasing fill factor ... a second portion ... a second hole type geometry ... the effective refractive increases in the same direction of increasing fill factor". This reference does not teach such. However the specification also fails to teach such are possible. These features therefore cannot be examined.

With regard to claims 17 and 18, this reference however does not teach explicitly that the zones are referred to Fresnel zones or echelette grating, however it is known in the art that binary grating can be formed within Fresnel zones or echelette grating, such modification would have been obvious to one skilled in the art.

With regard to claim 19, although this reference does not teach explicitly that the parameter has the values between 0.3 to 0.5, such modification is considered to be obvious matters of design choice to one skilled in the art to make the diffractive element achieves desired properties since the dispersion property of the material is known and the effective indices of the material are also known.

With regard to claims 20-22, this reference does not teach explicitly that the optical system is for imaging, however it has been held it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

***Response to Arguments***

8. Applicant's arguments filed January 6, 2009 have been fully considered but they are not persuasive. The amended claims have been fully considered and they are rejected for the reasons stated above.
9. Applicant's arguments concerning the increase and decrease of the effective index for pillar type and hole type geometries with respect to the increase and decrease of the fill factor are not persuasive to overcome the rejection since the amended features in claim 12 are not possible and are not supported by the specification.
10. Applicant's arguments concerning "nowhere does Chen disclose, teach or suggest that the variation in phase with the wavelength in a blazed binary diffraction optical element depends to the first order only on a characterization parameter  $\alpha$  of the structure and that in order to have an achromatic binary diffractive optical element it is necessary to optimize  $\alpha$ " (please see page 2 of the remark), however the instant application and the **claims** fail to teach such also. It is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The applicant being one skilled in the art must understand that any optical element has inherent dispersion property namely the refractive index changes with the wavelength of the light. The " $\delta n$ " in the equations are the dispersion property of the material such as quartz of Chen. The " $\Delta n$ " in the equation can be determined by Figures 1 and 2 of Chen. So with these known the factor  $\alpha$  can be defined.

***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (9:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephanie B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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